DOCUMENT RESUME

ED 227 977 RC 013 932

AUTHOR	Young, Douglas; And Others
TITLE	What Determines Bond Costs. Municipal Bonds Series.
INSTITUTION	Oregon State Univ., Corvallis. Cooperative Extension Service.; Western Rural Development Center, Corvallis, Oreg.
SPONS AGENCY	Department of Agriculture, Washington, D.C.
REPORT NO	WREP-60
PUB DATE	Jun 82
NOTE	13p.; For related documents, see RC 013 933-934.
AVAILABLE FROM	Western Rural Development Center, Oregon State University, Corvallis, OR 97331 ($.50).
PUB TYPE	Reports - Research/Technical (143) -- Guides - Non-Classroom Use (055)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Capital; *City Government; Community Leaders; *Interest (Finance); *Public Officials; Rural Areas; *Rural Development; Supplementary Reading Materials
IDENTIFIERS	Colorado; Montana; *Municipal Bonds; *Small Towns; Washington; Wyoming

ABSTRACT

Public officials in small towns who participate infrequently in the bond market need information about bond financing. This publication, one in a series of booklets published by the Western Rural Development Center using research gathered between 1967-77, discusses factors influencing the marketability and cost of bond financing for towns and cities in Washington, Colorado, Montana, and Wyoming, and identifies opportunities for towns and cities to trim their costs of financing bonds. Sections include: a definition of bond costs, factors affecting bond interest costs, national capital market conditions, characteristics of the issue, reducing flotation costs, a summary, and a glossary of terms. Appended is a summary of data on which the research was based. (AH)

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MUNICIPAL BONDS
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What Determines Bond Costs

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and Philip Wandschneider

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Municipal officials and local citizens occasionally are called upon to make complicated decisions involving large sums of money to finance long-term capital facilities. When the municipal bond market is considered as a possible source of funds, the financial implications of this option must be examined carefully: How much will interest charges on the bonds cost the community? Will small communities with small bond issues be discriminated against in the bond market? Finally, what steps should be taken to ensure that the needed capital is acquired at the most reasonable rates?

Public officials in all towns—especially those in smaller communities that participate less frequently in the bond market—need information about bond financing. This publication discusses factors influencing the marketability and cost of bond financing for towns and cities in Washington, Colorado, Montana, and Wyoming, and identifies opportunities for towns and cities to trim their costs of financing bonds.

This publication is addressed to local municipal officials and to those who advise them on public finance issues. It is a source of original research findings, not a "how-to" guide on the procedures of issuing bonds. Information on bond issuing is available in a number of other publications (Faas et al.; Lubov; Moak; Municipal Finance Officers Association). Specialists who would like more technical detail on the research underlying the information in this publication are referred to the parent report by Young, Jones, and Sher, *Financing Municipal Capital Projects in Western States.*

A summary of the data on which the research was based is found in the appendix. Bonds issued by towns and cities in Colorado, Montana, Washington, and Wyoming were examined for the period 1967-1977. Tables in the appendix show the average interest cost and a summary of the characteristics of the bonds and bond issuers for the bond issues studied.

To aid the reader, a glossary of specialized bond market terminology is included at the end of this publication.

Definition of Bond Costs

The total cost of bond financing includes interest payments, underwriter's profit, and flotation costs.

The interest payment to investors and the underwriter's profit together comprise Net Interest Costs (NIC), the usual measure of bond financing costs. For example, if an underwriter purchases a bond issue at an interest rate of 9.4 percent, and resells ("reoffers") it to the final investor for 9.1 percent, the NIC is composed of an *interest cost* of 9.1 percent and an *underwriter's profit* or spread of 0.3 percent.

Flotation costs refer to the "front end" expenses associated with putting a bond on the market. These expenses include payments to bond attorneys and financial consultants, bond and prospectus printing charges, and bond rating fees. Flotation costs can be expressed as a percentage addition to net interest costs (ANIC). Effective net interest costs are the sum of NIC and ANIC, which comprise the total cost of bond financing.

Factors Affecting Bond Interest Costs

According to financial specialists, the major determinants of the interest cost a bond issuer pays are: (1) the condition of the national capital market at the time the bond is issued, and (2) the characteristics of the individual bond.

Table 1 summarizes the results of a statistical analysis of the influence of various factors on the bond interest costs paid by towns and cities in Colorado, Montana, Washington, and Wyoming (see the appendix, especially Table A-1, for more information). The available data permitted inclusion of a more complete range of factors for Washington than for the other states.

Table 1. Summary of relationships of various factors to municipal bond interest costs for towns and cities in four western states[a]

CATEGORY	State			
Factor	Colorado	Montana	Washington	Wyoming
NATIONAL CAPITAL MARKET CONDITIONS				
1. Higher national bond interest rates	+	+	+	0
CHARACTERISTICS OF THE ISSUE				
2. Increased size, in dollars				
a. small and medium issues	0	0	–	0
b. very large issues	0	0	+	0
3. Average maturity, years	+	0	+	0
4. Acquisition of a rating	0	0	–	0
5. Longer years to first call	0	0	0	0
6. Competitive as opposed to negotiated issue	0	u	0	u
7. Revenue bond as opposed to general obligation bond	+	+	+	0
CHARACTERISTICS OF ISSUING TOWN				
8. Higher assessed valuation per capita, in dollars	u	u	0	u
9. Higher direct debt per capita, in dollars	u	u	+	u
10. Larger population	u	u	0	u
OTHER				
11. Higher number of bids	0	0	–	0

[a]KEY: "–" significantly decreased bond interest costs.
"+" significantly increased bond interest costs.
"0" did not show a significant relationship to bond interest costs.
"u" unknown relationship because the factor was not examined.

SOURCE: Young, Jones, and Sher.

National Capital Market Conditions

Interest costs on bonds issued by Colorado, Montana, and Washington cities exhibited a significant positive relationship with national average interest rates. In the relatively more populous and urbanized states of Colorado and Washington, this single variable contributed 85 percent of the statistical explanation of bond interest costs.

The bond market in Wyoming appears to be unique in its insulation from national market forces and other hypothesized determinants of interest costs. No included variables for Wyoming revealed statistically signficant relationships with bond interest costs.

The apparent policy implication of this strong relationship between national and local interest rates in three of the four states is that town officials should attempt to initiate large bond-financed capital improvement projects during periods of low interest rates. Delaying a project in the hope of lower interest rates, however, involves a tangle of conflicting factors that the decision maker must estimate and then trade off.

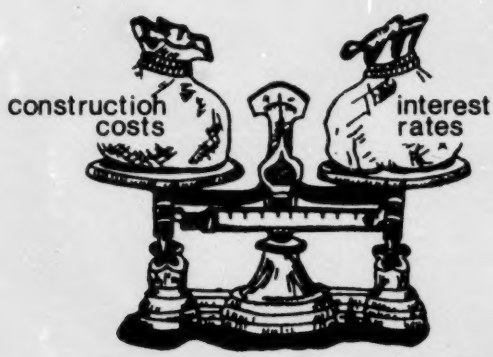

Table 2 presents an example that illustrates the factors and tradeoffs involved. There are four major issues:

1. Will interest rates increase or decline?
2. Will construction costs increase faster or slower than the general rate of inflation?
3. Delaying the project means delaying the beginning of service from the project. What is the value of receiving the services sooner versus later?
4. Will the inflation rate decline, remain constant, or increase?

Using Table 2, let us consider some alternative futures.

Alternative I represents the current situation for a proposed project: estimated construction costs of $1,000, inflation rate of 8 percent, and interest rate of 12 percent. What happens if the project is delayed in hopes of a future decline in interest rates?

Alternative II: Suppose there turns out to be no change in interest rates or inflation and construction costs mount at the same rate as general inflation. With increased construction costs the nominal cost of interest and principle payments for the project increases by $180 (Column IIa). But inflation has caused the dollars used to pay back the project to inflate also. In terms of real payments we come out even (Column IIb shows $1 due to rounding errors). But by delaying the project we have also pushed into the future the time when we will have to pay back the cost of the project. We therefore can use the money for some other purpose this year. Generally most people find that $100 today is worth more than $100 a year from now: money has a time value. If we assume that $104 next year is worth only $100 this year, the future payments (and benefits) must be discounted at 4 percent a year. Thus Column IIc shows that by delaying the project for one year, the discounted cost (present value) has declined by $35. By continuing to put off the project, we can cause the present value to shrink indefinitely. However, because delaying the project not only delays payments but delays the time when services from the project will be forthcoming, the cost of delay is the penalty of foregone services. (The reader can insert his own cost figure in line 3 at the bottom of Table 2.)

Alternative III: Suppose interest rates stay constant but construction costs increase faster than general inflation. In this scenario general inflation is assumed to continue at 8 percent but construction costs rise at 10 percent. (Construction costs typically have been rising faster than inflation in recent years.) Project delay means higher nominal (Column IIIa) and real (Column IIIb) costs. In the example, the present value of repayments is less than if the project were done today. If the delay penalty were thought to be $30, however, then Alternative III would have an increase in the present value of costs relative to Alternative I (whereas Alternative II would have a decrease in the present value of costs).

Alternative IV: Now suppose that interest rates end up increasing, although construction costs rise no faster than general inflation (8 percent). In this case, as one would expect, delay of the project causes there to be an unambiguous cost in nominal, real, and time-discounted (present value) terms. Clearly, when interest rates are expected to increase and construction costs rise at the rate of general inflation, the sooner the project is undertaken, the cheaper it will be.

Alternative V: Finally, suppose that interest rates do indeed fall, but construction costs are rising faster than

general inflation. The rise in construction costs and decline in interest rates have opposite influences on cost. In the example, the result is a decrease in cost if the project is delayed as measured by all three indexes: nominal repayments, real repayments, and discounted real repayments. This decrease in cost would, of course, have to be weighed against the loss of foregone services.

Policy Implications: Delaying a project in order to obtain a future lower interest rate can result in substantial savings. However, anticipated savings from lower interest costs may be eaten up by rapidly inflating construction costs, which have characterized recent years. Furthermore, the demand for immediate service may also override interest cost savings.

Besides balancing potential interest savings (or losses) against rising construction costs and service delays, the local official must consider another issue in his juggling act: the course of inflation. If inflation is expected to continue at about the same rate (as we assumed in Alternatives I, II, and III in Table 2), it has no effect on the timing decision because the inflation rate is built into the nominal interest rate. So while you may pay back debts with inflated dollars, you also are paying a higher interest rate. But if the inflation rate increases after the bonds are issued, then bonds are being redeemed with inflated dollars. In effect, the higher inflation rate has lowered the real interest rate that the issuer must pay. For example, a bond issued at 12 percent interest during a period of 8 percent inflation would effectively have its interest rate cut if, after issue, the inflation rate increased to 10 percent. Bond holders would, of course, lose and the market value of the bonds they hold would decline. High inflation rates per se do not enable borrowers to pay back loans with inflated dollars, but inflation that has not been anticipated and therefore incorporated into the interest rate that the bond issuer is charged. Inflation is discussed further in the section on maturity schedule below.

Table 2. Influence of changes in project costs and bond interest rates on repayment flows for a 15-year bond

	NO DELAY OPTION			ONE-YEAR PROJECT DELAY OPTIONS UNDER ALTERNATIVE PROJECT COST (C) AND BOND INTEREST (i) CHANGES											
	I. C = 1,00, i = 12%			II. C = 1,080, i = 12%			III. C = 1,100, i = 12%			IV. C = 1,080, i = 15%			V. C = 1,100, i = 9%		
Year	Nominal repts.[a]	Real repts.[b]	Real pres. vals.[c]	Nominal repts.[a]	Real repts.[b]	Real pres. vals.[c]	Nominal repts.[a]	Real repts.[b]	Real pres. vals.[c]	Nominal repts.[a]	Real repts.[b]	Real pres. vals.[c]	Nominal repts.[a]	Real repts.[b]	Real pres. vals.[c]
	..... $1,000			..... $1,000			..... $1,000			..... $1,000			..... $1,000		
1981	147	136	131	0	0	0	0	0	0	0	0	0	0	0	0
1982	147	126	116	159	136	126	162	139	129	185	159	147	136	117	108
1983	147	117	104	159	126	112	162	129	114	185	147	131	136	108	96
1984	147	108	92	159	117	100	162	119	102	185	136	116	136	100	85
1985	147	100	82	159	108	89	162	110	90	185	126	104	136	93	76
1986	147	93	73	159	100	79	162	102	81	185	117	92	136	86	68
1987	147	86	65	159	93	71	162	95	72	185	108	82	136	79	60
1988	147	79	58	159	86	63	162	88	64	185	100	73	136	73	53
1989	147	74	52	159	80	56	162	81	57	185	93	65	136	68	48
1990	147	68	46	159	74	50	162	75	51	185	86	58	136	63	43
1991	147	63	41	159	68	44	162	69	45	185	79	51	136	58	38
1992	147	58	36	159	63	39	162	64	40	185	73	46	136	54	34
1993	147	54	32	159	58	35	162	60	36	185	68	41	136	50	30
1994	147	50	29	159	54	31	162	55	32	185	63	36	136	43	27
1995	147	46	26	159	50	28	162	51	28	185	58	32	136	43	24
1996	0	0	0	159	46	25	162	47	25	185	54	29	136	40	21
(1) Totals	2,205	1,258	983	2,385	1,259	948	2,430	1,284	966	2,775	1,467	1,103	2,040	1,078	811
(2) (Delay—No delay)				+ 180	+ 1	−35	+ 225	+ 26	−17	+ 570	+ 209	+ 120	−165	−180	−172
(3) Penalty (cost) of delay due to foregone services[d]							(e.g. 30)	(e.g. 30)	(e.g. 30)						
(4) Net cost of delay = (2) + (3)							(255)	(56)	(13)						

[a] The bond is assumed to be repaid in equal amortized installments over its 15-year life.

[b] Nominal repayments are divided by $(1.08)^t$, where t = (year — 1980), to deflate all payments back to (beginning year) 1981 dollars, to correct for an annual assumed rate of general price inflation of 8% per year.

[c] Real repayments are divided by $(1.04)^t$, where t = (year — 1980), to convert all payments to their (beginning year) 1981 present value (p.v.), given an annual *real* time discount rate of 4%.

[d] Decision-making body enters its own estimate for this item.

Characteristics of the Issue

Size of issue

A U-shaped relationship between issue size and interest rate is expected because (1) investors may demand an interest premium on small issues to recoup higher marketing and transaction costs, and (2) very large issues may incur higher interest costs because their size reduces the pool of competing bidders as underwriters have to form consortiums to bid on such large issues (Young, Sher, and Jones). Somewhat surprisingly, however, the expected U-shaped relationship was confirmed only for Washington cities (see Figure 1). Based on the evidence from the 1967-1977 data, issue size did not significantly influence interest rates paid by cities in Colorado, Montana, or Wyoming.

For Washington cities, where size was significantly related to interest cost, the vast majority of issues were under seven million dollars when economies of size prevailed (see Figure A-1). However, the interest cost savings from larger sizes were generally very modest. Furthermore, the fact that small issues, especially those under $100,000, incurred somewhat higher interest and flotation costs does not necessarily mean that they were being unfairly discriminated against. These modest cost increases may simply reflect higher real marketing costs incurred by underwriters for small issues.

Policy implications: The results cited above suggest little incentive for local or state authorities to undertake extensive efforts to pool small issues to reduce interest costs. (For very small issues, however, there probably will exist potential for reducing *flotation* costs by increasing issue size, as will be discussed later in this publication.)

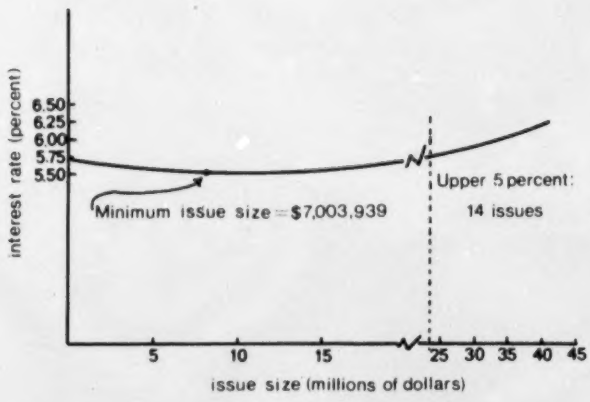

Figure 1—Interest cost curve for Washington towns
SOURCE: Young, Jones, and Sher.

Type of bond

General obligation bonds were shown to enjoy a significant interest cost advantage over revenue bonds in all states but Wyoming. Local officials may be limited, however, in the choice of type of bond issue. Revenue bonds, of course, can be sold only for uses that generate revenue. Institutional and equity considerations often dictate the use of revenue bonds for revenue producing services such as public transit, water, sewer, and power projects. Repayment on such projects from user-fee revenues ensures that those citizens enjoying the services of such projects will bear the primary burden of paying for them. This arrangement may enhance the political acceptability of such bond issues. On the other hand, nonrevenue producing services used by the general public such as public safety, municipal administration, and parks and recreation are natural candidates for general obligation financing because all taxpayers are potential beneficiaries of such services.

Policy implications: The choice of revenue versus general obligation bonds is and should be based on political and institutional as well as interest cost considerations. For those perhaps infrequent projects where political or institutional considerations do not clearly dictate the bond type, town officials should be aware that general obligation bonds generally are the lower cost alternative.

Maturity schedule

Longer maturing bonds showed significantly higher interest costs for city issues in Colorado and Washington, but not in Wyoming or Montana. Higher rates for longer maturing bonds are generally expected because longer maturities expose investors to the possibility of missing opportunities for better investments, and to the possibility of increased inflation rates. If the inflation rate *increases*, borrowers can pay their bonds off with "cheap" inflated dollars. Therefore, if local officials expect that inflation may increase in the future, they can reduce real costs by spreading the bond maturity dates into the future. If the current inflation rate is high, however, and the rate of inflation is expected to drop (from 10 percent to 6 percent, for example), then longer maturities are to be avoided by bond issuers because they will be locked into the high interest rates of the inflationary time of issue. When the inflation rate is high, and both sellers and buyers expect the inflation rate (and hence the interest rate) to drop, then the normal situation will be reversed and longer maturing issues may actually bring lower interest rates than shorter maturities.

Policy implications: The municipal official should be aware of the modest increase in interest costs usually associated with longer maturities, and with the general relationship between inflation, interest rates, and maturity. Most financial experts, however, suggest that it is wisest to base decisions about maturity scheduling primarily on the length of project life, the anticipat-

ed cash flow (stream of receipts and expenditures), and the overall debt structure and capital improvement plan of the community.

Rating

A bond rating significantly reduced interest rates only for Washington cities.

Policy implications: Even in Washington, the acquisition of a rating is probably justified only for issues over $250,000 for which the issuer is reasonably assured of receiving an "A" or better rating. The incentive for Colorado, Montana, and Wyoming city issuers to purchase a rating would appear to be weaker yet, especially for smaller issues.

Call provisions

Over all four states, no evidence was found that shorter call provisions significantly boosted interest costs.

Policy implications: Town officials are encouraged to insert call provisions on longer maturing bonds as these can be quite valuable should interest rates fall.

Negotiated sale vs. competitive bid:

The results for Colorado and Washington provided a clear test for western city bond issuers of the effect of negotiated bond sales on interest costs. Contrary to highly publicized findings from earlier studies based on Pennsylvania, and national samples (Forbes and Peterson; Joehnk and Kidwell), negotiated issues by Colorado and Washington cities did not suffer interest cost penalties. Indeed, interest costs for negotiated and competitive issues did not significantly differ.

Policy implications: City officials in these western states should search for a negotiated sale on preferential terms for certain issues. This option should be explored with full knowledge of prevailing competitive bid rates as indicated by Moody's national interest index, or recent sales of similar issues. The negotiated option may be particularly appealing for small towns floating smaller issues where a commercial bank or private investor may be willing to pick up an issue at a favorable rate as a gesture of public support and goodwill.

Reducing Flotation Costs

For small issues by smaller towns, cutting flotation costs may offer more potential for saving money than trimming interest costs. Table 3 presents a complete listing of the breakdown of flotation expenses incurred by 21 of the 22 general obligation bonds issued by Washington cities in 1977. Total flotation costs are clearly correlated with issue size, which ranged from $30,000 to $7,500,000. As summarized in Figure 2, flotation costs per dollar of capital raised tend to decline. However, the results listed in Table 3 also show considerable variation around the issue size/flotation cost trend.

Figure 2 reveals that flotation costs, when translated to interest cost terms, substantially increase the effective interest cost paid by very small issues, but that the cost increase for large issuers is more modest. For example, on the average, floation cost would add 40 basis points to the interest cost for a $100,000 issue but only 14 basis points for a one million dollar issue.

Policy implication: Officials should examine opportunities for pooling several small issues into one larger issue to reduce flotation costs.

Table 3 reveals that nearly all issuers hired the services of a bond attorney. The fee for this service was roughly related to issue size. A financial consultant was employed for only 5 of 13 of the issues under $500,000, and a rating was purchased for no issue less than $500,000. Cities issuing bonds larger than $500,000 generally hired a financial consultant and purchased ratings. Bond printing and advertising expenses appear to be relatively fixed, showing only modest correlation to the size of issue. Special election costs ranged from $174 to $8,519.

Policy implications: Flotation costs can be trimmed by careful management practices. Costly special elections can be avoided by issuing limited obligation bonds that do not require a vote by the electorate, or by scheduling bond elections concurrently with general elections. Political considerations, however, may preclude this option. There is some evidence that scheduling a special election may increase the probability of a favorable vote (Wandschneider et al.).

Shopping around for legal, printing, and advertising services, subject to specified quality standards, can generate cost savings. Although the services of a bond attorney will always be necessary, financial consulting services are unlikely to be affordable for very small issues.

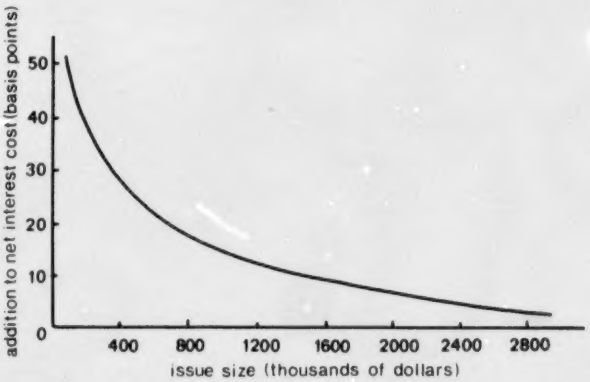

Figure 2—Effects of a change in issue size in addition to net interest cost
SOURCE: Young, Jones, and Sher.

Table 3. Flotation expenses by issue size, general obligation bonds, Washington state municipalities, 1977.

Issue Size (dollars)	Expense Categories							
	Total Cost	Financial Consultant	Bond Attorney	Bond Printing	Prospectus	Advertising	Special Election	Rating
30,000	843	0	425	418	0	0	0	0
45,000	1,482	0	400	648	0	434	0	0
72,000	1,809	0	600	600	0	609	0	0
98,000	857	0	0[a]	41	38	278	0	0
100,000	4,496	1,750	592	1,020	864	270	0	0
105,000	2,863	1,250[a]	675	470	0	22	446	0
150,325	3,498	0	1,800	966	0	276	456	0
240,000	2,960	500	338	1,170	0	90	362	0
250,000	1,758	0	813	555	0	216	174	0
300,000	1,166	0	654	394	0	118	0	0
300,000	1,796	0	696	1,021	38	43	0	0
350,000	3,680	1,750	1,054	860	16	0	0	0
450,000	3,637	2,000	818	783	0	36	0	0
550,000	6,419	2,800	1,311	769	0	637	0	900
750,000	4,783	1,250[b]	1,685	935	0	22	891	0
1,600,000	4,866	0[c]	2,875	703	0[c]	438	0	850
2,000,000	13,798	4,830	3,410	1,097	1,140	419	2,252	650
2,500,000	20,682	2,500	3,241	1,145	1,732	395	8,519	3,150[d]
2,750,000	9,909	2,850	4,127	753	0	1,079	0	1,100
4,600,000	14,974	2,500	6,554	1,820	0	225	1,200	2,675[d]
7,500,000	23,360	6,250	10,250	1,576	1,254[e]	435	0	3,600[d]

[a] By special agreement, no bond attorney's fee was charged.
[b] A $2,500 consultation fee was charged, which was allocated on the billing at $1,250 for each issue.
[c] No fee was charged for exchange for the right to refund a prior issue.
[d] Rated by both Moody's and Standard and Poor's.
[e] Reported as travel expense. Prospectus cost was included in with financial consultant, as should have been travel, however the listing as prospectus permitted footnoting.

SOURCE: Young, Jones, and Sher.

Summary

Bond interest costs are determined by two major factors: (1) national capital market conditions, and (2) characteristics of the individual bond. In addition to net interest costs, reducing flotation costs may offer small towns the most promising source of cost savings in issuing bonds.

Recommendations for reducing interest costs

- Issue bonds during periods of low interest rates, if possible. As emphasized in the earlier discussion, however, the potential savings in interest cost by delaying a project must be balanced against (1) the possibility that construction costs will increase more rapidly than the general price level, and (2) the cost of service foregone during the delay in the project.
- Issue general obligation bonds, unless political, institutional, or equity considerations warrant the use of revenue bonds. The lower cost of general obligation bonds, however, must be balanced against the cost of obtaining voter approval; see flotation cost recommendations below.
- When choosing maturity length, consider the project's length of life and cash flow projections, and the community's debt structure and capital improvement plan, as well as interest cost impacts of maturity length.
- Acquire a rating only for those Washington issues over $250,000 for which the issuer is reasonably assured of an "A" or better rating. (There is less incentive for Colorado, Montana, and Wyoming town issuers to purchase a rating, especially for smaller issues.)
- Insert shorter call provisions on longer maturing bonds to be able to take advantage of any falling interest rates prior to the bond's maturity date.
- Pursue all market outlets (such as commercial banks, underwriters, and private investors) for

possible negotiated sale on preferential terms. Because national experience shows that negotiated sales are often more expensive than competitive bids, pursuit of negotiated sale outlets must be done with knowledge of prevailing competitive bid rates.

Recommendations for reducing flotation cost

- Examine opportunities for pooling several small issues by the town into one larger issue.
- Avoid costly special elections by issuing *limited* obligation bonds that do not require a vote by the electorate or by scheduling bond referenda concurrently with general elections. (This potential savings in flotation cost, however, must be weighed against the consideration that a general election may decrease the probability of a favorable vote.)
- Shop around for legal, printing, and advertising services, subject to specified quality standards.
- Use additional professional help to plan, design, and sell the larger, more complicated issues. (Services of a bond attorney will always be necessary; however smaller issues will rarely justify the expense of hiring financial consultant.)

Above all, local officials should exercise careful judgement in considering these recommendations for reducing bond interest costs and flotation costs, which involve trade-offs between the competing factors identified.

Officials new to the bond market are encouraged to become familiar with the references on bond issuing procedures identified at the beginning of this publication. Another helpful resource would be to consult with officials and staff of other towns who have recently issued bonds.

Glossary

Addition to net interest cost (ANIC): Flotation costs converted to a percentage, which can be added to net interest cost to determine the effective net interest cost a borrower pays.

Basis point: 100 basis points equal 1 percent.

Bond attorney: An attorney who specializes in legal matters related to bonds. His task is to ensure that a bond is properly and legally offered and to issue an opinion on the tax-exempt status of the bond.

Call: The right of the issuer to redeem (purchase) a bond prior to its maturity, at face value or an amount in excess of the face value of the bond.

Call provision: The terms of the issue that explicitly describe the rights of the issuer to redeem the bonds of that issue.

Financial consultant: An individual who will, for a fee or some other consideration, aid and advise a municipality in issuing a bond. He generally prepares and distributes a prospectus that describes the issuer and its finances, and is present at the bid openings.

Flotation or "front end" costs: Costs that must be paid at or before the time of offering rather than over the life of the bond. These costs include fees to bond attorneys and financial advisors, bond and prospectus printing, and the cost of having a bond rated.

"Front end loading:" Refers to underwriters specifying higher interest rates on the earlier maturities and lower interest rates on later maturities. This practice works to the disadvantage of bond sellers as it extracts larger interest payments from their treasuries early in the repayment schedule, when these funds could otherwise be retained to earn interest or to accelerate construction schedules to beat inflation.

General obligation bond: A bond backed by the "full faith and credit" of the municipality. It requires voter approval.

Limited general obligation bond: A general obligation bond that may be issued by an elected governing body without voter approval. It is sometimes referred to as a councilmatic bond, because in Washington state limited general obligation bonds can be issued by a majority vote of the town council.

Maturity: The date a bond becomes due and payable. It is characterized by the year the bond matures: for example, a 1979 bond is one that matures in 1979.

Net interest cost: The mean interest rate paid on all debt outstanding over the life of the bond issue.

Rating: A formal judgment as to the creditworthiness of a debt instrument.

Rating agency: An agency, either Moody's or Standard and Poor's, that will, for a fee, rate a bond as to its creditworthiness.

Reoffering: A bond offered for resale by an underwriter. This constitutes a second sale; the first is from the issuer to the underwriter.

Revenue bonds: Bonds issued to provide the capital for financing revenue-producing assets or activities. Revenue bond interest and amortization is normally paid from the revenues generated by the project. Debt service is not guaranteed by the full faith and credit of the municipality. Therefore, if there is a default, the issuer is under no obligation to make payments from general revenues.

Spread: The difference between the price an underwriter pays for a bond issue and the price for which he sells it.

Underwriter: The individual or institution that purchases the entire bond issue from the municipality and then sells it (reoffers it) to individual investors.

(Source of glossary: Young, Jones, and Sher.)

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Prepared by Douglas Young, Department of Agricultural Economics, Ronald C. Faas, Extension economist, and Philip Wandschneider, Department of Agricultural Economics, all of Washington State University.

This publication is part of the Municipal Bonds series produced by the Western Rural Development Center. Other titles in the series include:

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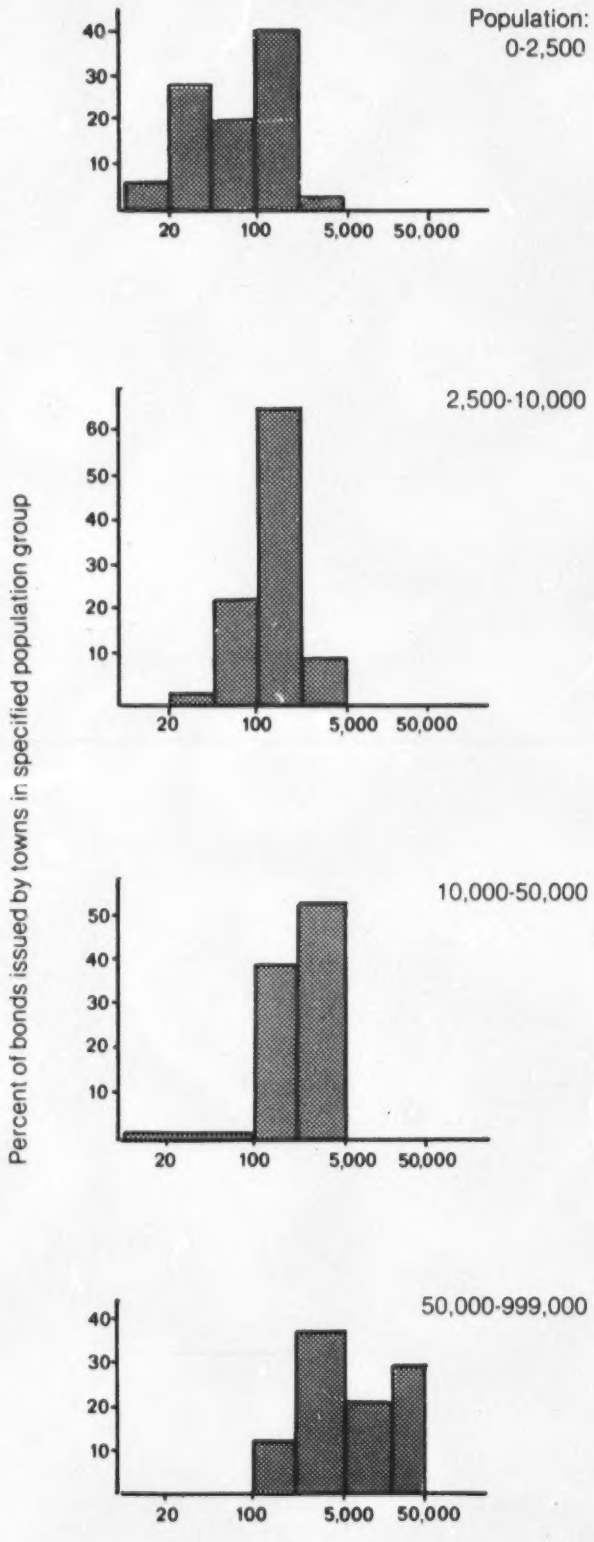

Figure A-1—Relationship between town population and bond issue size for bonds issued by Washington towns
SOURCE: Young, Jones, and Sher.

Appendix: Characteristics of the Bonds and of the Bond Issuers

Table A-1 summarizes average interest cost levels and selected bond characteristics for samples of bonds issued by towns and cities in Colorado, Montana, Washington, and Wyoming, from 1967 to 1977. The samples, which range from 31 bonds for Wyoming to 283 for Washington, were derived from *The Daily Bond Buyer*, a financial market periodical. Although *The Daily Bond Buyer* fails to report many smaller bond issues, the data in Table A-1 reveals some interesting variations in interest costs and bond characteristics over these four states.

Wyoming municipalities issued bonds at the most favorable rate, averaging 5.12 percent during the 11 years 1967-1977. Washington municipalities, on the other hand, paid interest costs averaging some 63 *basis points* (hundredths of a percentage point) higher than those paid by Wyoming towns. Interest costs incurred by Colorado and Montana towns fell between these extremes.

The second row in Table A-1 lists national average bond interest rates, an indicator of the tightness of national capital markets over the periods the bonds were issued in each state. These results reveal that Washington and Montana towns and cities paid an average premium of 18 and 14 basis points over the national market. Wyoming and Colorado, on the other hand, averaged 44 and 20 basis points under the national market. (This difference may be partly explained by the higher proportion of revenue bonds in Washington and Montana.)

Bonds issued by Colorado and Washington cities averaged two to three times larger than the size of bonds issued by Montana and Wyoming cities. The latter states contain fewer large cities and no metropolitan areas comparable to Denver and Seattle. All the average bond sizes reported in Table A-1 are probably distorted upward somewhat by the underrepresentation of small issues in *The Daily Bond Buyer*.

A strong positive correlation exists between issue and issuer size. This correlation is shown graphically in Figure A-1 for Washington muncipalities. Over half of all bonds by Washington towns with less than 2,500 population were smaller than $100,000, whereas cities with more than 50,000 population issued no bonds less than $100,000.

There also is a strong positive relationship between frequency of participation in the bond market and town population. Figure A-2 is based on observations of 101 Washington towns, and reveals, for example, that a town of about 3,700 is expected to have entered the market 2 of the 11 years 1967-1977, whereas a town of 20,600 is expected to have been in the market 4 of the 11.

Average maturity ranged between 10 and 16 years among the four states' issues. Montana issues averaged slighty less than two bids each, while those from the other four states averaged between three and five bids. Municipalities in the more populous states of Colorado and Washington were roughly twice as likely to obtain ratings on their bonds as were Montana and Wyoming towns.

Table A-1. Average levels of interest cost and related factors for samples of bonds issued by towns and cities in four western states, 1967-77

Factor	State			
	Colorado	Montana	Washington	Wyoming
Bond interest cost	5.42%	5.60%	5.75%	5.12%
National average bond interest rate	5.62%	5.46%	5.57%	5.56%
Size (millions of (1967) dollars)	4.80	1.40	3.65	1.90
Average maturity (years)	14.12	15.56	13.91	10.77
Number of bids for competitive issues	4.77	1.89	3.48	4.42
Percent rated	82.7	36.4	61.8	38.7
Percent competitive	89.9	97.7	73.9	83.9
Percent revenue bonds	37.5	52.3	60.4	32.3
Sample size	168	44	283	31

SOURCE: Young, Jones, and Sher.

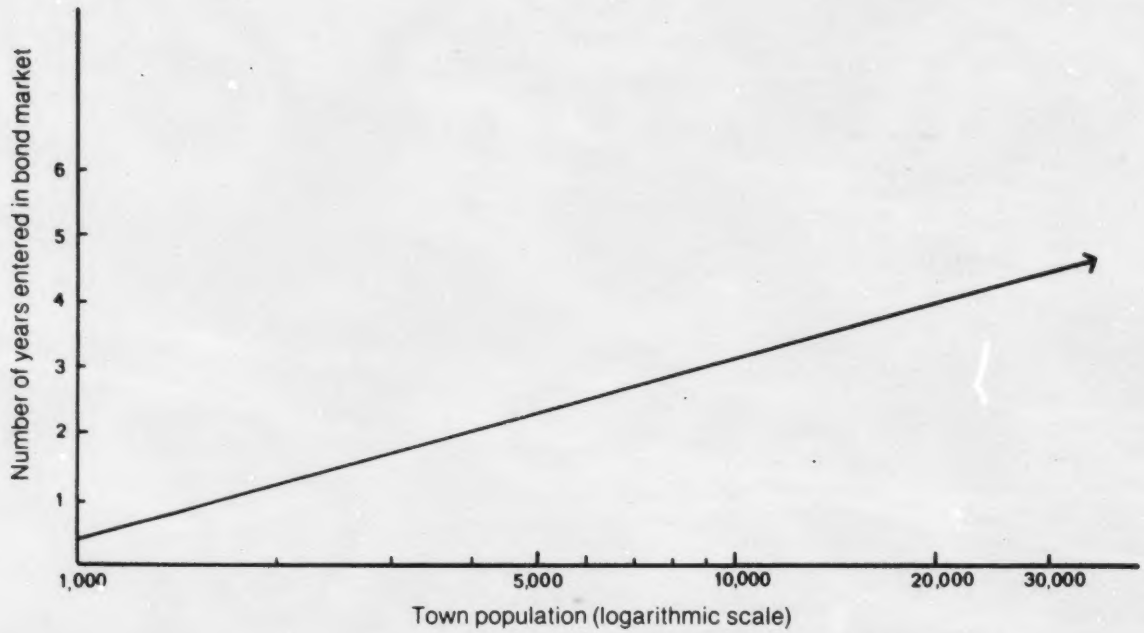

Figure A-2—Market persistence as related to population for 101 Washington state towns using the bond market, 1967-77
SOURCE: Young, Jones, and Sher.

June 1982

WREP 60

A Western Regional Extension Publication

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Henry Wadsworth, director, Oregon State University Extension Service. Other western state Extension directors include James W. Matthews, University of Alaska; Roy Rauschkolb, University of Arizona; J. B. Siebert, University of California; Lowell H. Watts, Colorado State University; Noel P. Kefford, University of Hawaii; H. R. Guenthner, University of Idaho; Carl J. Hoffman, Montana State University; Bernard M. Jones, University of Nevada; J. Oren, New Mexico State University; C. Dennis Funk, acting director, Utah State University; J. O. Young, Washington State University; and Harold J. Tuma, University of Wyoming. The University of Guam Extension Service, W. P. Leon Guerrero, director, also participates. Extension invites participation in its programs and offers them to all people without discrimination.

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